Introduction

Congratulations on your purchase of the Universal Disk Controller for your Apple II Plus, //c, or Laser 128 computer! **(The Universal Disk Controller will also work well in a IIGS. However, since it does not completely emulate the IIGS's disk controller, some copy protections won't work.)** The Universal Disk Controller (we'll just call it the UDC from here on out) combines the power of the Apple's Unidisk 3.5 and standard floppy disk controllers into one slot. In addition, it allows you to connect our Chinon 800K drives for the Macintosh and use them just as if they were an Apple Unidisk. Since these Mac-style drives are often less expensive than Apple's Unidisk 3.5, this can result in considerable savings.

Your UDC can connect two 5-1/4" or 3-1/2" drives to your Apple II Plus, Apple //c, or Laser 128 computer. Here are the drives we have tested it with:

Drive Type:	Drive Size:
Apple //c external	5-1/4
Laser FD-100	5-1/4
Chinon 800K	3-1/2
Mac 800K external	3-1/2
Mac 400K external	3-1/2
IIGS Platinum drives	3-1/2

Picking a Slot

The UDC will work in slots 1 through 7 (although 4, 5, 6, and 7 are most commonly used) in an Apple II Plus, Apple //c, or Apple IIGS. It can plug into the side slot (which is slot 7) on a Laser 128 or can plug into either slot (5 or 7) in the Laser 128 Expansion Box. In any case, there are certain advantages to using certain slots:

The Apple II Plus and non-enhanced Apple //c will not recognize a 3-1/2 inch controller card (like the UDC) as a disk device. This only means that it will not automatically boot from it on a power-up. Therefore, you can plug it into any slot that is free on your computer. You can access it, however, just like a standard disk controller from either DOS 3.3 or ProDOS. (For example, to boot a disk from basic type: PR # slot return.)

The Laser 128, enhanced Apple //c, and Apple IIGS will automatically find and try to boot from a diskette in a drive plugged into the UDC if the UDC is plugged into a higher numbered slot than the standard floppy disk controller. Therefore, if you would like to boot from the drives plugged into the UDC, we recommend plugging the UDC into slot 7. Plugging the UDC into a higher slot than your standard floppy disk controller will not prevent you from booting from drives plugged into your standard floppy disk controller. Your computer will first try to boot from disks plugged into the UDC. If there are no diskettes in the drives, it will move to the next lower slot (slot 6) which will do a normal boot. Therefore, all you have to do to boot from your standard floppy disk controller is remove all diskettes from drives plugged into the UDC.

If you are replacing your existing floppy disk controller, you will want to plug the UDC into slot 6. If you are installing the UDC into an Apple IIGS, it will probably replace the internal disk port in slot 6. See the section titled "Installing the UDC into the IIGS" for more details.

Connecting the Drives

You can connect either a 3-1/2 inch drive or a 5-1/4 inch drive to either connector. All drives plug onto the 19 pin (DB-19) connectors on the UDC drive 1 and drive 2 cables. (You cannot use a "daisy-hain" connector even if the drive you are connecting has one.)

If you are connecting one 5-1/4 inch drive and one 3-1/2 inch drive and you are using DOS 3.3, *you should plug the 5-1/4 inch drive into the "drive 1" connector. DOS 3.3 disks will not always* *boot correctly from drive 2. so this arrangement gives you maximum flexibility.*

Once you have decided upon a slot for your UDC and what drives to connect, you can plug the UDC into the computer. **Make sure the computer power is off before plugging in the UDC! otherwise damage to your UDC, drives and computer can occur that is not covered by your UDC warranty!**

Now go ahead and connect the drive cables to the UDC connectors. On an Apple //e, IIGS and Laser 128 Expansion Box, there are cut-outs on the back panel designed for DB-19 connectors. Once the drives are installed, you are ready to go!

One of the best ways to get started using your 800K drives is to boot the enclosed Copy II Plus disk and begin using the Utilities. With them, you can transfer non-protected programs and data files that used to require several disks to a single 800K disk. The Copy II Plus utilities support both ProDOS and DOS 3.3 and 3-1/2 and 5-1/4 inch drives.

Installing the UDC into the IIGS

You can install the UDC into the Apple IIGS into slots 5. 6.or 7. If you connect it to slot 7, you won't need to do anything additional. However, since slot 6 is the normal disk slot; we recommend that you use it instead. Once the card is installed and the disk drives are connected, you need to tell the IIGS to use the UDC instead of its built-in disk port. To do this, make sure all your connections to the UDC are correct and the UDC is plugged firmly into slot 6. Next, turn on the computer. The IIGS should now be telling you to check the boot device (unless you still have a disk drive connected to the built-in controller). In any case, press "Control-Option-Reset" to enter the IIGS Control Panel. Use the down arrow key to select the entry titled "Slots". Now use the down arrow key to move the highlighted bar over the entry called "Slot 6". You will notice it now says "Disk Port". Press the right arrow key and it will change to "your card". Press the Return key to make this selection permanent. Now select "Quit" option and your UDC is correctly installed. If you ever want to use the internal controller again, simply use the control panel to select "Disk Port" for slot 6 and the UDC will be disabled.

Note: You can connect Apple IIGS platinum 3.5" drives into the UDC. However, you will not be able to use the "daisy chain" connector on the back of the Apple drives - use the two UDC connectors instead.

WHAT IS INSIDE ?

Before you start to work with your UDC Card, check that you've got the following items :

- UDC card
- Copy II Plus® bundle
- Owner's registration card
- 90-day limited warranty card
- This user's manual

If any of the above is missing, please consult your dealer.

WHAT IS THE UDC CARD ?

The UDC (for Universal Disk Controller) card is a versatile floppy disk controller that works with the following computers :

- LASER 128®
- LASER 128EX®
- LASER 128EX/2™
- APPLE® II +
- APPLE IIe®
- APPLE IIGS®

If you are using your UDC card with the LASER 128 series computers, you will also need an expansion box which can provide extra power and shielding for your peripheral cards. Consult your dealer for availability of the expansion box.

Besides traditional 5.25" drives (143K), the UDC card also supports the larger capacity 3.5" drives (800K). Up to a maximum of four disk drives (two 5.25" drives + two 3.5" drives) can be hooked up with the UDC card. The types of disk drives supported by the UDC card include :

- LASER FD-100c 5.25" drive
- LASER FD-356 3.5" drive
- LASER FD-356DC 3.5" daisy-chain drive
- APPLE 5.25 daisy-chain drive
- APPLE 3.5 daisy-chain drive

The UDC card is automatically recognized by ProDOS® as a block storage device and hence requires no special disk-based software drivers.

INSTALLING THE UDC CARD

Installation of the UDC card is simple and should take only a few minutes. Read the following paragraphs carefully and follow the instructions step by step.

● First of all, turn OFF your computer (and the expansion box if you are using the LASER 128 series computers).

 > *WARNING: Do not plug or unplug any peripheral card while your computer is on, Otherwise, your computer and/or the peripheral card may be damaged.*

● If you are using the LASER 128 series computers, plug the expansion box into the 50-way expansion connector on the left side of your computer, following the instructions in the user's manual that comes with the expansion box.

Then plug the UDC card into the slot inside the expansion box which corresponds to port 5 of the computer. Set the "INTERNAL/EX-TERNAL PORT 5" switch inside the ROM door on the bottom of the computer to "EXTERNAL" (refer to computer's user's manual for more information on this switch).

 > *Note: The built-in expansion RAM interface at port 5 of the computer must be disabled when the UDC card is in use. This is necessary because each I/O port can only support one device at a time.*

If you are using an APPLE II + /IIe/IIGS, just plug the UDC card into any of the peripheral expansion slots (preferably slot 5) located at the rear end of the motherboard. The card will only fit in one direction and so you don't have to worry about inserting the card in the wrong orientation.
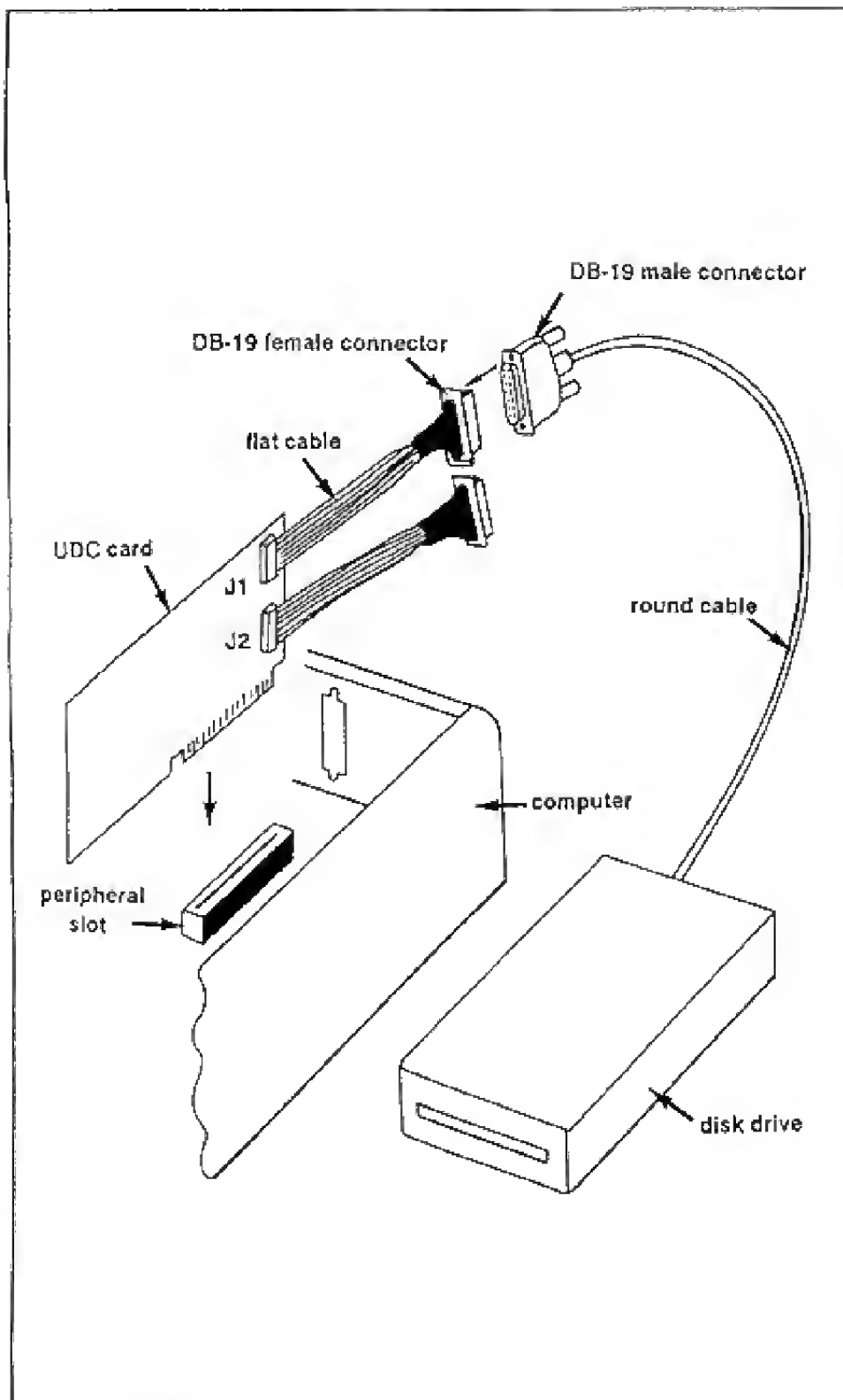
Fig. 1 Installing the UDC card in Apple II+/IIc/IIGS

● The UDC card comes with two DB-19 female connectors which are connected to the main PCB by 20-way flat cables. They are labelled with J1 (upper) and J2 (lower) on the PCB. On the other hand, your disk drive should have a round cable that terminates with a DB-19 male connector. Connect your drives to J1, J2 or the connector at the back of a daisy-chain drive connected to J1. The allowable drive configurations are shown in the following table:

	J1	J2
(1)	3.5	-
(2)	5.25	-
(3)	3.5	3.5
(4)	3.5	5.25
(5)	5.25	3.5
(6)	5.25	5.25
(7)	3.5/3.5	-
(8)	3.5/5.25	-
(9)	5.25/5.25	-
(10)	3.5/5.25	5.25
(11)	3.5/5.25/5.25	-
(12)	3.5/3.5/5.25	-
(13)	3.5/3.5/5.25/5.25	-

Note: The "/" sign represents a daisy-chain connection

The UDC card firmware uses a special sequence to search for devices connected to it. As a result, the logical slot and drive number assigned to a particular physical device will depend on your drive configuration as well as the location of the boot-up device.

For configurations (1) to (6), the device connected to J1 will always be assigned as drive 1 while the device (if any) connected to J2 will be assigned as drive 2.

For configurations (7) to (9), the daisy-chain drive connected to J1 will be assigned as drive 1 while the device connected to the back of the daisy-chain drive will be assigned as drive 2.

Configurations (10) to (13) require the UDC card to be installed in slot 5 in order to work properly. If it is installed in any other slot, then only two of the devices can be recognized and the rest will be ignored. Also note that 3.5" drives must come before 5.25" drives in a chain of devices connected to J1.

For configuration (10), the 5.25" drive connected to J2 will always be assigned as slot 5, drive 2 and cannot be used as the boot-up device. On the other hand, both the 3.5" drive and 5.25" drive connected to J1 are bootable. The boot-up device will always be assigned as slot 5, drive 1 while the other will be assigned as slot 2, drive 1.

Configuration (11) is very similar to (10). The first two devices in the chain will be assigned as either slot 5, drive 1 or slot 2, drive 1 depending on which one is used as the boot-up device. The last device in the chain will always be assigned as slot 5, drive 2.

For configuration (12), the second device in the chain will always be assigned as slot 5, drive 2 and is not bootable. Again, depending on which one is used as the boot-up device, the first and last device will be assigned as either slot 5, drive 1 or slot 2, drive 1.

Finally for configuration (13), the four devices can be classified into two types: 5.25" drive and 3.5" drive. Within each type of device, the one that comes earlier in the chain will be assigned as drive 1 while the other will be assigned as drive 2 and is not bootable. The same type of device will always be assigned to the same slot (either 2 or 5). If you boot from the first 3.5" drive in the chain, then the 3.5" drives will be mapped to slot 5 while the 5.25" drives will be mapped to slot 2. If you boot from the first 5.25" drive in the chain, then the 3.5" drives will be mapped to slot 2 while the 5.25" drives will be mapped to slot 5.

IMPORTANT: *Although the electronics of the UDC card is designed to support up to four daisy-chain drives at connector J1, such a configuration is not recommended because signal degradation and electrical noise pick-up along the connection cables will affect reliability adversely. As a result, we suggest you to limit the length of the chain to not more than two.*

Now your UDC card is ready to work!

Turn on your computer. Insert an application program diskette with ProDOS (e.g. the Copy II Plus diskette included) into the appropriate boot-up drive and close the drive door. The program will be loaded into memory and executed automatically.